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BIOLOGICAL EVALUATION OF PEST CONDITIONS AND POTENTIAL HAZARD TREES IN TWO CAMPGROUNDS ON THE KAIBAB NATIONAL FOREST, ARIZONA

MARCH 1990

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BIOLOGICAL EVALUATION OF PEST CONDITIONS AND POTENTIAL HAZARD TREES IN TWO CAMPGROUNDS ON THE KAIBAB NATIONAL FOREST, ARIZONA

MARCH 1990

By

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INTRODUCTION

In 1989, Forest Pest Management in Region 3 initiated an insect and disease incidence survey of recreation sites. These surveys were conducted to evaluate the overall "health" of proposed and existing campground (CG) areas on the National Forests. Nora Laughlin, Landscape Architect, supplied a list of campgrounds to evaluate on the Kaibab National Forest. Kaibab Lake Campground (CG) and Whitehorse Lake CG were the areas surveyed in this study. The information supplied in this report offers pest management considerations for vegetation management plans.

OBJECTIVES

The objectives of this survey were to: (1) Evaluate and document the incidence of insect and disease activity, and (2) detect and document hazardous trees in existing sites.

METHODS

The procedures followed are described in the "Inventory of Insects, Diseases, and Hazard Tree Incidence Work Plan for Developed and Proposed Recreation Sites of National Forest System Lands, Southwest Region" (Rogers, 1989). The study within each recreation area was two part; a hazard tree analysis and an insect and disease survey. The hazard tree analysis was patterned on procedures described by Johnson (1981). A hazard tree is defined as any tree with both a mechanical defect that could cause the tree to fail and a potential target. Only trees showing structural defects and located in areas of intensive public use, e.g. within and adjacent to camping sites, toilets, and parking pads, were evaluated. The individual tree data included: Species, diameter inside bark (DIB), location, defect, and hazard rating, which was recorded on a Tree Hazard Evaluation Form (Appendix).

The hazard rating system used is a two-part failure/risk rating system, each part using a descriptive rating scale of High (H), Medium (M), and Low (L) to estimate probability. The first part of the rating system is an estimate of the probability of mechanical failure of the tree, or major portions of the tree, within the next five years. This estimate is based on a number of factors including: Presence of decay, condition and location of roots and crowns, and the amount of lean. The second part of the rating is an estimate of the probability of injury to people or damage to property if the tree does fail. Only trees located in areas more likely to be occupied by people or property (risk rating = high or medium) were recorded on the evaluation forms.

The insect and disease survey was performed as a Region 3 Stage II Stand Exam Survey described in the Region 3 Silvicultural Examination and Prescription Handbook, FSH 2409.26d. The following data were collected for each tree recorded at each plot: Species, diameter at breast height (DBH), height, tree history, a damage code, and a code for dwarf mistletoe rating (DMR) (Hawksworth, 1977). The data was recorded on the Region's Forest/Stand Tree Record Sheet and run through the Region 2/3 Stage II Data Entry/Runstream Generation Program. The runstreams were submitted to Fort Collins Computer Center for processing.

RESULTS AND DISCUSSION

Both Kaibab Lake CG and Whitehorse Lake CG are composed primarily of ponderosa pine with scattered juniper and oak. The results of the stand examination are shown in Table I. The overall BA is the same but Whitehorse CG has a greater representation of basal area in larger, overstory trees than Kaibab CG. No significant insect or disease activity was observed during the stand examination of either campground. Risk of bark beetle outbreak in these campgrounds is low at these stocking levels (Demars and Roettgering, 1982). Although southwestern dwarf mistletoe (DM) is the most significant pest in southwestern ponderosa pine type forests (Hawksworth, 1961), no DM infection was observed during this survey.

Table I. Information from Stage II stand examinations of recreation sites on the Kaibab National Forest.

Campground		Understory	Overstory	Total
Kaibab Lake	QSD[a]	10.8	25.0	11.7
	BA[b]	68	15	83
	#stem[c]	107	4	111
Whitehorse	QSD	8.2	23.9	11.0
	BA	41	42	83
	#stems	112	14	126

[a]QSD = Quadratic Stand Diameter

[b]BA = Basal Area/Acre

[c]# Stems = # Stems/Acre

A total of 22 hazard trees were recorded during this survey. All were ponderosa pine trees rated in the high-medium failure/high risk category. The majority of trees examined were dead or had dead tops. Other defects include severe lean or decay. The number of trees in each rating class are shown in Table II but detailed information is on examination records in the Appendix. The hazard ratings provided are not recommendations for action. They are a

professional estimate of the probability of tree failure and should be used by the land manager during the decision-making process for management plans in recreation areas. Considerations for hazard tree treatment are offered in Management Alternatives.

Table II. Summary of hazard trees in each rating class by recreation site surveyed on the Kaibab National Forest.

	Number of Trees with Rating of:				
Campground	H/H[a]	M/H	H/M	L/H	TOTAL
Kaibab Lake	6	6	1	4	17
Whitehorse Lake	1	1	2	1	5
Total	7	7	3	5	22

PA = Picnic Area; CG = Campground; GC = Group Camp

[a] Failure/Risk Rating: H = High; M = Medium; L = Low

MANAGEMENT ALTERNATIVES

1. Do nothing. Trees rated as potential hazards will continue to decline and the probability of failure will increase. Trees will continue to be damaged by campers and by natural causes, so the number of potential hazards will also increase. The possibility of tree failure with property damage and injury to people will increase.

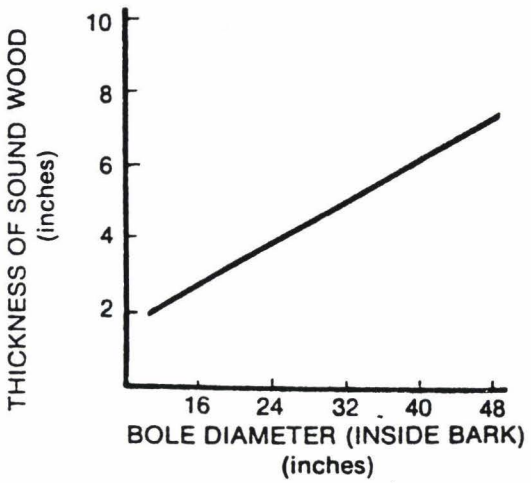

Figure I. Thickness of sound wood in outer shell required to maintain 66% of original strength in trees with heart rot (from Johnson, 1981). If the amount of sound wood exceeds that established by the line on the graph, the tree is considered relatively safe from failure.

2. Remove or lessen the probability of failure of hazard trees. The land manager must decide the level of risk acceptable in an area and hazard trees would be removed or treated until that risk level is reached. In many cases, pruning dead branches would substantially reduce the probability of failure. Dead tops on conifers should be removed as soon as practical (Mills and Russell, 1981). For trees showing signs of internal decay, the thickness of sound wood in the outer shell determines relative safety (Figure 1). Trees that lean naturally usually are reinforced by compensatory growth. However, structural damage to leaning trees, such as severed roots, large basal cavities, and internal decay increase the probability of failure and threatens visitor safety (Johnson, 1981).

3. Remove the targets. Under this alternative, campgrounds or selected areas within campgrounds that are identified as targets are closed to public use. Removal of potential targets will remove the problem of hazard trees.

4. Develop a vegetation management plan based on objectives developed for the site, which reduces incidence of insect and disease and development of hazard trees. This may include activities such as thinning a dense stand of trees which reduces stress and probability of bark beetle attack.

5. A combination of alternatives 2 and 3 and 4. These alternatives are not mutually exclusive and can be used in combination to solve specific problems in many areas.

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APPENDIX A

TREE HAZARD EVALUATION

EXHIBIT 8

Administrative unit WILLIAMS RD

Examined by TODD R & S

Site name KAIBAB LAKE CG

Date 7-26-89

Campground or Picnic Unit No.	Tree location (azimuth and distance from fixed object)[1]	Species	D	*See abbreviations Type of defect: Leaning (angle of lean °)	Uprooting, root rot, butt rot, basal cavity	Bole wounds, bole cankers, decay (conks)	Weak fork, limb defect, brooms, dead top	Potential targets: Permanent structure, parked vehicle, people	Temporary structure, high-use trails	Low-use trails, signs	Failure rating[2]: High	Medium	Low	Risk rating[3]: High	Medium	Low	Additional comments	Acti
	Abbreviations: TO=Toilet, TB=Table, FR=Fire ring, PP=Parking pad, TP=Tent Pad, WH=Water hydrant, BG=Bridge, TC=Trash can, TD=Trailer dump																*Defect abbreviations: RR=Root rot, BR=Bole or butt rot, BW=Bole wound, BC=Basal cavity, LD=Limb defect, WF=Weak fork, C=Conk(s), DT=Dead top, ER=Exposed roots	6
60	TB 202° 20'	PP	10.5				X	X					X	X			Dead top	
45	FR 222° 12'	PP	14.5	20°	X				X		X				X		Exposed roots Broken dead & leaning onto another tree	
45	FR 220° 15'	PP	11.2		X				X		X				X		" " "	
33	TB 32° 54'	PP	37.5					X				X		X			TREE IS DEAD	
31	TB 95'	PP	33.5					X			X			X			Dead tree	

1 Sketch map on reverse side.

2 Probability of a tree failing within the next 5 years.

3 Probability of a tree hitting a potential target.

TREE HAZARD EVALUATION

EXHIBIT 8

Administrative unit Chalender RD

Examined by TODD R & S

Site name Whitehorse CG

Date 7-29-89

Campground or Picnic Unit No.	Tree location (azimuth and distance from fixed object)[1]			Species		*See abbreviations Type of defect: Leaning (angle of lean °)	Uprooting, root rot, butt rot, basal cavity	Bole wounds, bole cankers, decay (conks)	Weak fork, limb defect, brooms, dead top	Potential targets: Permanent structure, parked vehicle, people	Temporary structure, high-use trails	Low-use trails, signs	Failure rating[2]: High	Medium	Low	Risk rating[3]: High	Medium	Low	Additional comments	Actio
	Abbreviations: TO=Toilet, TB=Table, FR=Fire ring, PP=Parking pad, TP=Tent Pad, WH=Water hydrant, BG=Bridge, TC=Trash can, TD=Trailer dump																		*Defect abbreviations: RR=Root rot, BR=Bole or butt rot, BW=Bole wound, BC=Basal cavity, LD=Limb defect, WF=Weak fork, C=Conk(s), DT=Dead top, ER=Exposed roots	7
25	TB	304°	80'	PP	33	17°					X				X	X			Large Conk - top is fading	
25	TB	36°	43'	PP	21.5			X decay		X			X			X			Lightning strike - decay	
14	TB	122°	73'	PP	24	19°					X			X			X			
9	TB	33°	10'	PP	31.5	17°				X				X		X				
8	TB	30°	69'	PP	25	16°				X				X		X				
8	TB	39°	72'	PP	26	18°				X				X		X				
6	TB	296°	45'	PP	19				X				X			X			Dead top	
29	TB	266°	36'	PP	24				X	X			X			X			Dead top	
29	TB	218°	16'	PP	22	10°					X			X		X				

1 Sketch map on reverse side.

2 Probability of a tree failing within the next 5 years.

3 Probability of a tree hitting a potential target.

TREE HAZARD EVALUATION

EXHIBIT 8

Administrative unit Chalender RD

Examined by TODD R&S

Site name Whitehorse CG

Date 7-27-89

Campground or Picnic Unit No.	Tree location (azimuth and distance from fixed object)[1]		Species	D.I.B.	*See abbreviations Type of defect				Potential targets			Failure rating[2]			Risk rating[3]			Additional comments	Actio
	Abbreviations: TO=Toilet, TB=Table, FR=Fire ring, PP=Parking pad, TP=Tent Pad, WH=Water hydrant, BG=Bridge, TC=Trash can, TD=Trailer dump				Leaning (angle of lean °)	Uprooting, root rot, butt rot, basal cavity	Bole wounds, bole cankers, decay (conks)	Weak fork, limb defect, brooms, dead top	Permanent structure, parked vehicle, people	Temporary structure, high-use trails	Low-use trails, signs	High	Medium	Low	High	Medium	Low	*Defect abbreviations: RR=Root rot, BR=Bole or butt rot, BW=Bole wound, BC=Basal cavity, LD=Limb defect, WF=Weak fork, C=Conk(s), DT=Dead top, ER=Exposed roots	8
29	TB	120° 6'	PP	25		X			X					X	X			Big Basal Cavity	
44	TO-9	138° 60'	PP	26				X	X			X			X			Forked tops - both dead	
43	TB	290° 6'	PP	36	13°				X				X		X			Leaver	
60	TB	82° 44'	PP	29				X	X			X			X			Dead tree	
61	TB	99° 20'	PP	28		X			X					X	X			Basal cavity	
64	TB	110° 190'	PP	26				X			X	X				X		Weak fork	
70	TB	146° 10'	PP	18					X			X			X				
16 Hostsign		320° 15')	PP	38				X	X				X		(			Dead top	

1 Sketch map on reverse side.

2 Probability of a tree failing within the next 5 years.

3 Probability of a tree hitting a potential target.